

AMENDMENTS TO THE CLAIMS

Please cancel Claims 1 through 68 without prejudice to or disclaimer of the subject matter recited therein.

Please add Claims 69 through 76 as follows:

1-68. (Cancelled)

69. (New) An optical system comprising:

an optical element including (a) a first optical component for forming an intermediate image of an object and having a refractive surface of rotationally asymmetric shape and at least one reflective surface, and (b) a second optical component for forming a final image with light from the intermediate image and having a refractive surface of rotationally asymmetric shape and at least one reflective surface; and

an aperture stop,

wherein the following relation is satisfied:

$$\left| \frac{D \cdot f1}{S \cdot AR1} \right| < 0.1$$

where D is a size of a noise source near the intermediate image, f1 is a maximum focal length of said first optical component out of those dependent upon azimuths, an

azimuth at the maximum focal length of said first optical component being defined as ξ , S is an on-axis astigmatic difference at the intermediate image position, and AR1 is a diameter of an exit pupil by said first optical component in correspondence to the azimuth ξ , at the time an aperture of said aperture stop is maximized.

70. (New) An optical apparatus according to Claim 69, wherein the following relation is satisfied:

$$D = 35 \mu\text{m}$$

71. (New) An optical system comprising:
an optical system according to Claim 69; and
an image pickup device,
wherein the final image is formed on a light receiving surface of said image pickup device by said optical system.

72. (New) An optical system comprising:
an optical element including (a) a first optical component for forming an intermediate range of an object and having a refractive surface of rotationally asymmetric shape and at least one reflective surface, and (b) a second optical component for forming a final image with light from the intermediate image and having a refractive surface of rotationally asymmetric shape and at least one reflective surface; and

an aperture stop,

wherein the following relation is satisfied:

$$\left| \frac{D \cdot f1}{S \cdot AR2} \right| < 0.3$$

where D is a size of a noise source near the intermediate image, f1 is a maximum focal length of said first optical component out of those dependent upon azimuths, an azimuth at the maximum focal length of said first optical component being defined as ξ , S is an on-axis astigmatic difference at the intermediate image position, and AR2 is a diameter of an exit pupil by said first optical component in correspondence to the azimuth ξ , at the time an aperture of said aperture stop is minimized.

73. (New) An optical apparatus according to Claim 72, wherein the following relation is satisfied:

$$D = 35 \mu\text{m}$$

74. (New) An image pickup apparatus comprising:

an optical system according to Claim 72; and

an image pickup device,

wherein the final image is formed on a light receiving surface of said image pickup device by said optical system.

75. (New) An image pickup apparatus comprising:

an optical system including (a) a first optical component for forming an intermediate image of an object, (b) a second optical component for forming a final image with light from the intermediate image, and (c) an aperture stop,

wherein at least one of said first optical component and said second optical component comprises an off-axial curved surface, and wherein the final image is formed on a light receiving surface of an image pickup device by said optical system, and wherein the following relation is satisfied:

$$\left| \frac{5b \cdot f_1}{|\beta| \cdot S \cdot AR1} \right| < 0.1$$

where b is a minimum resolution settled by the image pickup device, f_1 is a maximum focal length of said first optical component out of those dependent upon azimuths, an azimuth at the maximum focal length of said first optical component being defined as ξ , S is an on-axis astigmatic difference at the intermediate image position, β is an image magnification of said second optical component to the azimuth ξ in the vertical direction, and AR1 is a diameter of an exit pupil by said first optical component in correspondence to the azimuth ξ at the time an aperture of said aperture stop is maximized.

76. (New) An image pickup apparatus comprising:

an optical system including (a) a first optical component for forming an intermediate image of an object, (b) a second optical component for forming a final image with light from the intermediate image, and (c) an aperture stop,

wherein at least one of said first optical component and said second optical component comprises an off-axial curved surface, wherein the final image is formed on a light receiving surface of an image pickup device by said optical system, and wherein the following relation is satisfied:

$$\left| \frac{5b \cdot f1}{|\beta| \cdot S \cdot AR2} \right| < 0.3$$

where b is a minimum resolution settled by the image pickup device, f1 is a maximum focal length of said first optical component out of those dependent upon azimuths, an azimuth at the maximum focal length of said first optical component being defined as ξ , S is an on-axis astigmatic difference at the intermediate image position, β is an image magnification of said second optical component to the azimuth ξ in the vertical direction, and AR2 is a diameter of an exit pupil by said first optical component in correspondence to the azimuth ξ at the time an aperture of said aperture stop is minimized.